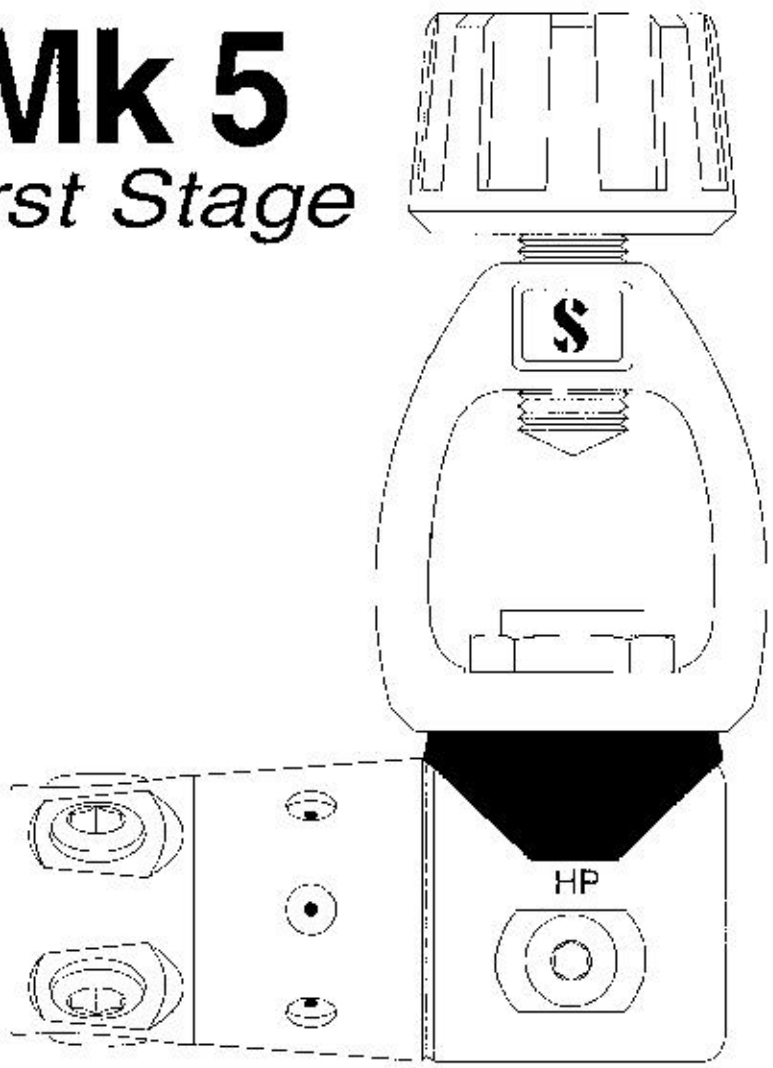
Figure #1

SCUBAPRO®

Technical Service Reference & Repair Guide

Mk 5
First Stage



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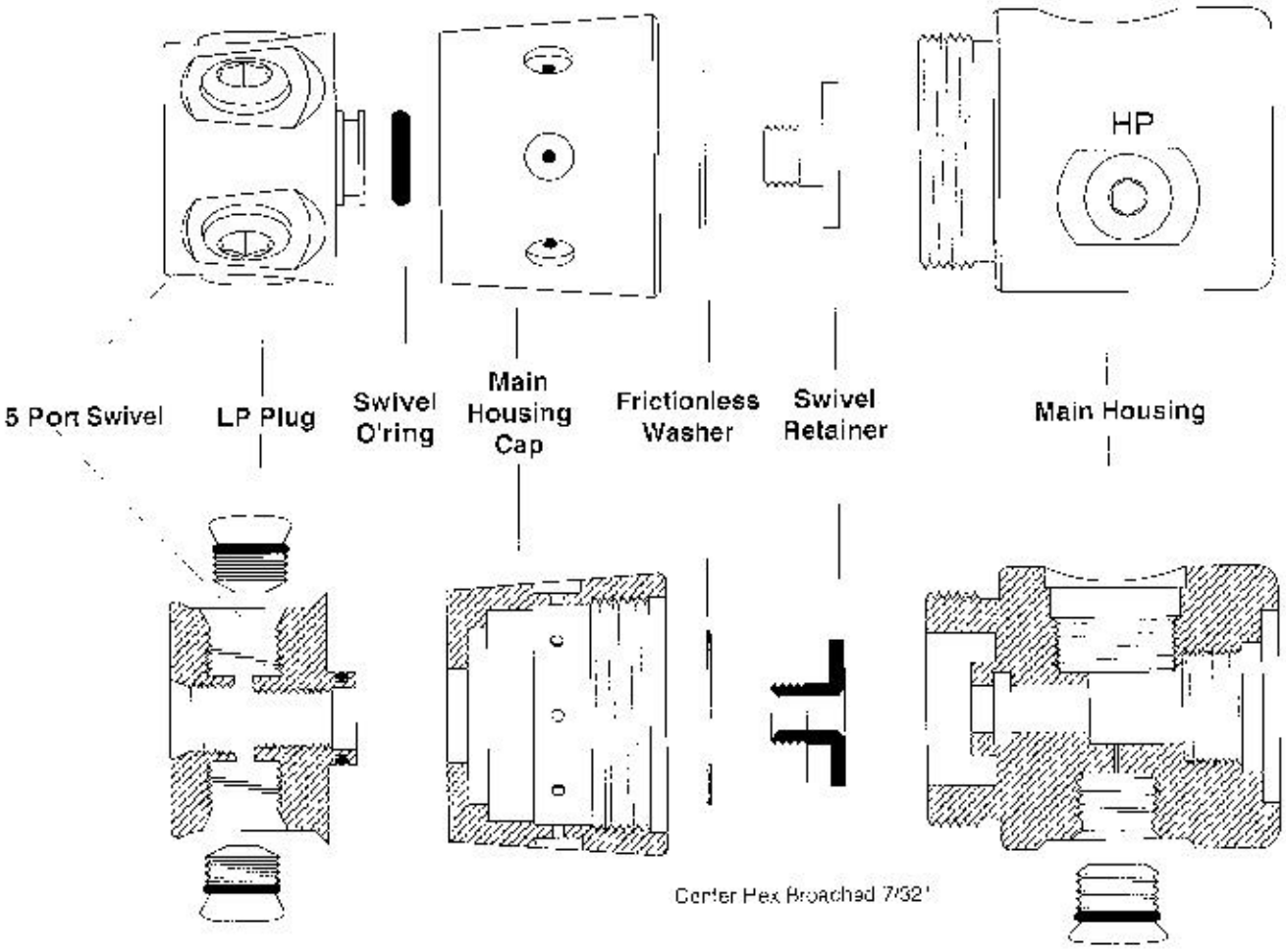
Important Note: The following information "is not" designed to be a complete training guide for infield servicing of the Mark 5 first stage. All Scubapro technicians are required to attend an annual repair clinic to insure safe handling and servicing of Scubapro products.

Figure #2

SCUBAPRO® Mark 5 First Stage

Main Housing & Swivel Assembly



Notes:

The Mark 5 main housing and swivel parts are detailed to the left in both the external and cut-away views. The assembly of these components is reasonably straight forward. Observe the following procedures when doing the final assembly:

- Torque the swivel retainer to 55-70 inch lbs via the 7/32 center hex broach.
- Replace and lubricate the swivel port o'ring.
- Tighten the main housing and main housing cap using the multi-tool. The tension should be secure enough to prevent disassembly by hand.

Pete Wolfinger, Scubapro Dealer Support

Figure #3

SCUBAPRO® Mark 5 First Stage

Piston & HP Seat Components

Notes:

The illustration below shows the piston and high pressure seat components. Both the piston head and piston stem o'rings should be replaced and properly lubricated. The HP seat is also always replaced during service. Be sure to stay up-to-date on the latest engineering bulletins regarding current HP seats available as replacement parts.

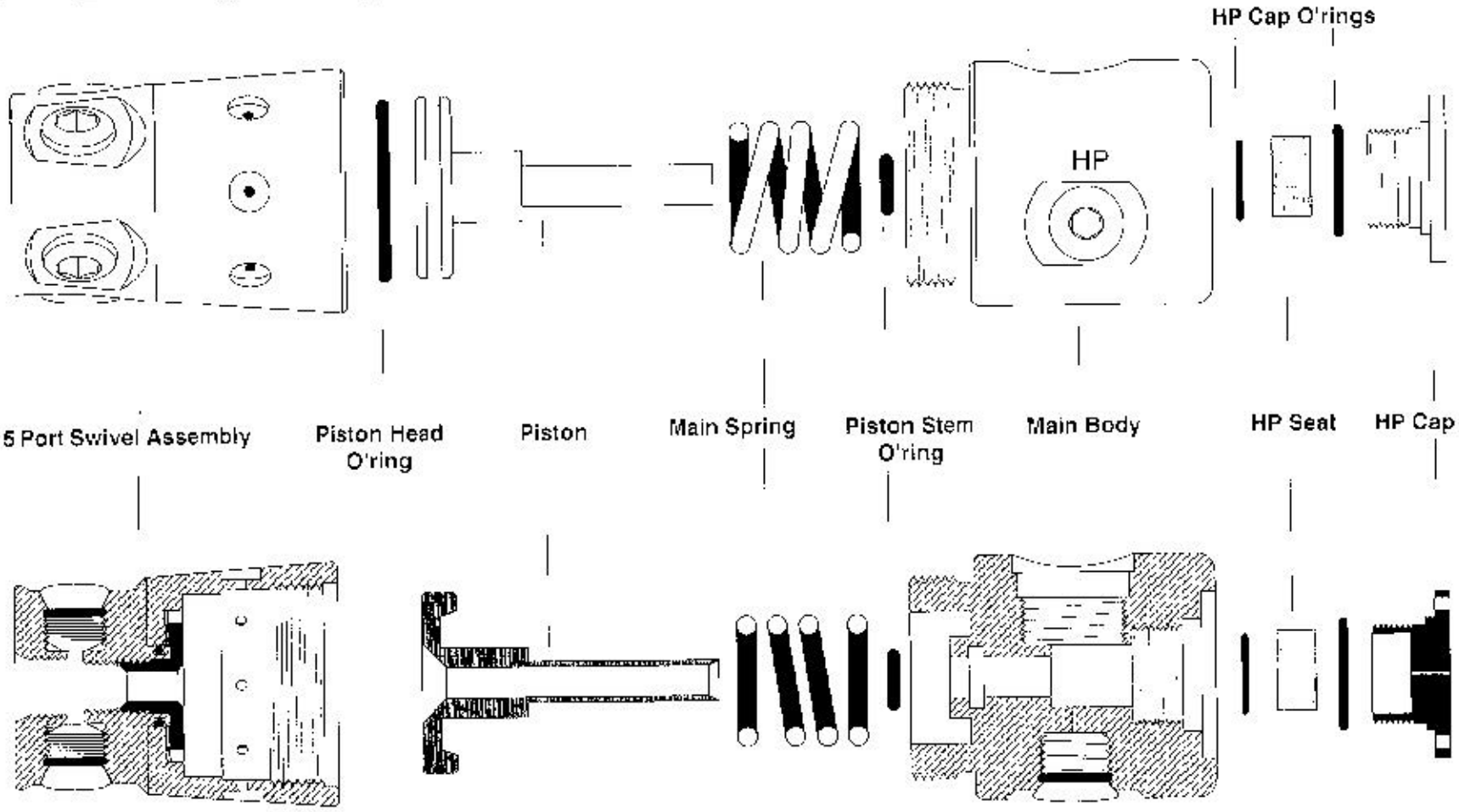


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Figure #4

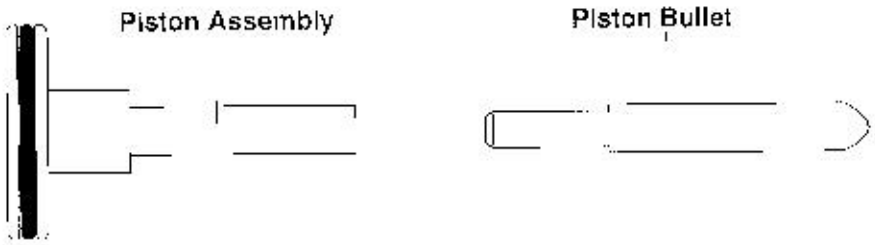
SCUBAPRO® Mark 5 First Stage

Piston & Seat Installation

Note:
Be sure to use a piston bullet when installing the piston into the main housing. The bullet slides into the pistor bore and allows the sharp piston knife edge to slide through the internal stem o ring without damaging the o'ring. The bullet can be removed from the far end of the main body after the piston is in place. After the bullet has been removed, the HP seat assembly can be threaded into the main housing. Tighten the HP cap using the pin spanner on the multi tool (not shown).

HP Seat Removal/Installation

To remove the HP seat from the cap, hold an air blow gun over the small hole in the cap and pressurize. The air will get behind the seat and blow it forward out of the cap. Position your hand over the seat during this operation to catch the seat when it exits the cap. Install a new seat by "hard pressing" the seat into the cap. Be sure that the cone shaped recess is facing out. This recess helps to avoid a sonic whistle caused by high pressure air flowing around the seat and into the piston bore.



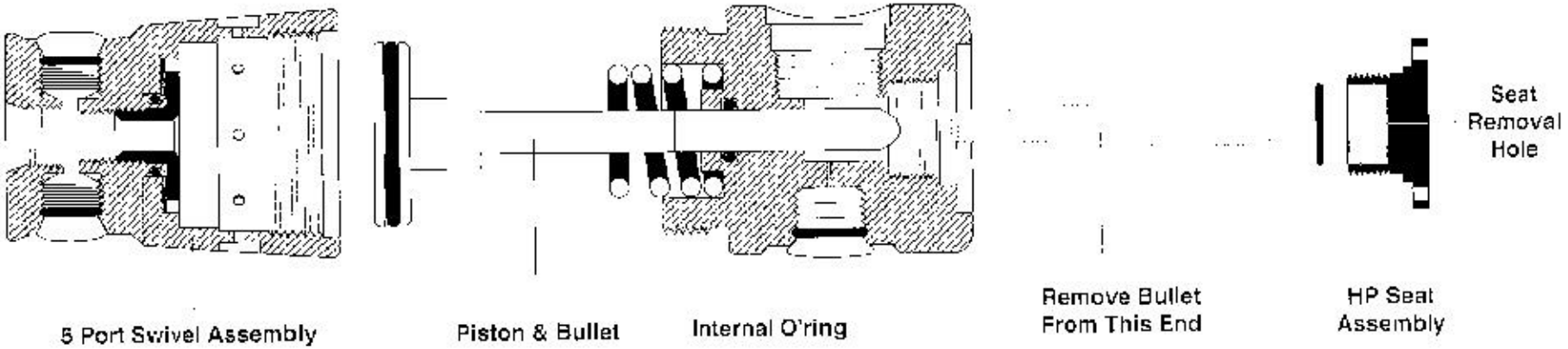


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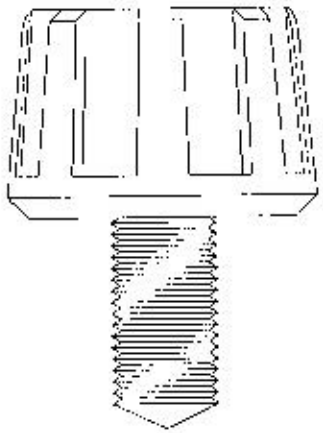
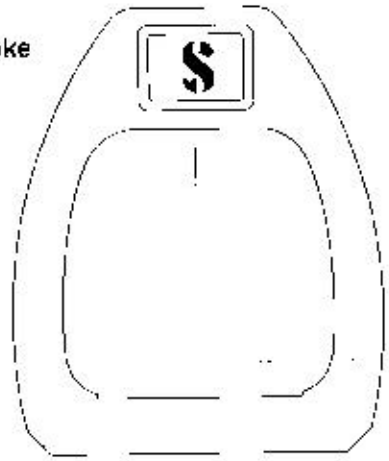
Figure #5

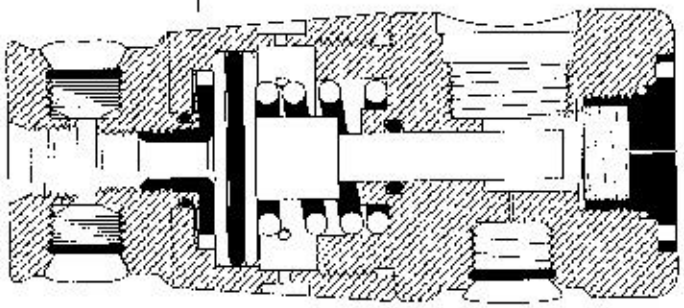
SCUBAPRO® Mark 5 First Stage
3000 PSI Yoke Components

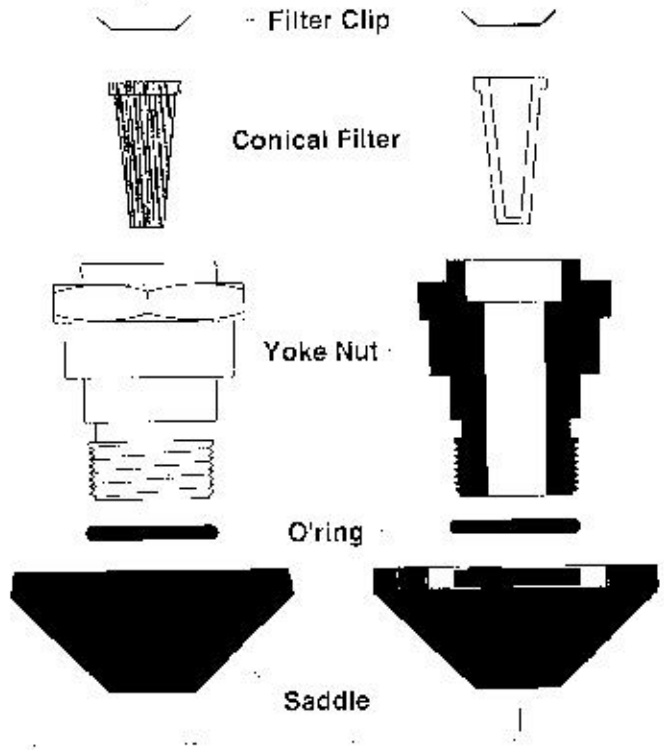


Note:

All Scubapro first stages are shipped with a 3000 psi yoke system for connecting the first stage to a standard o'ring seated valve. A Din connecting system is also available. The strength of the yoke has been increased several times over the last 25 years. It is highly recommended that all older yoke systems be replaced with the current 3000 psi yoke. This recommendation is based on the availability of 3000 psi air cylinders and the likelihood of the first stage being exposed to this higher pressure. In the interest of safety, please pass this suggestion along to your customers.







The conical filter and clip are not covered in the Scubapro Limited Lifetime Warranty, but it is recommended that it be replaced during annual service. Over a period of time the tiny air pores in the filter will become plugged and reduce air flow to the first stage. The internal condition of the tank and the presence of other foreign material, such as air filter chemicals blown into the tank during filling, may require replacement of the conical filter at more frequent intervals. The best course is to inform your customer of the tank condition and eliminate the source of the problem.

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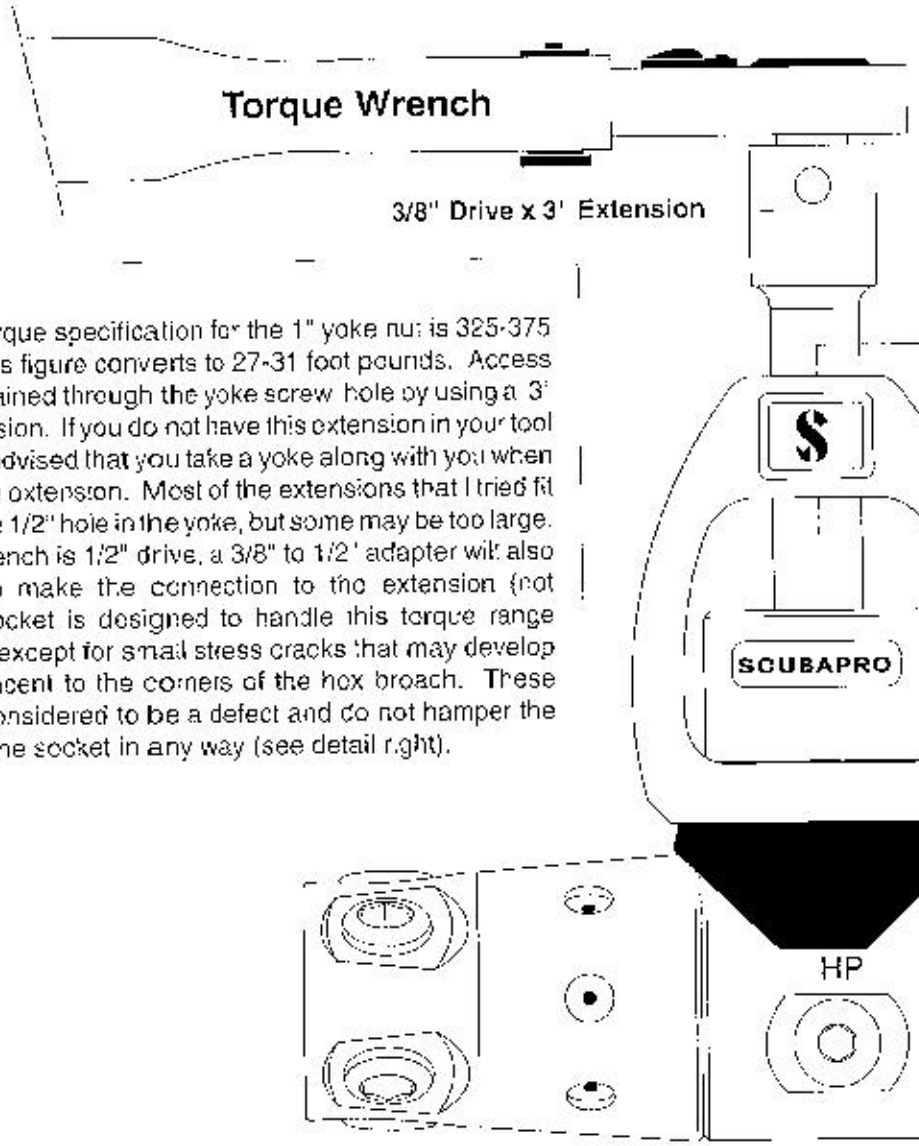
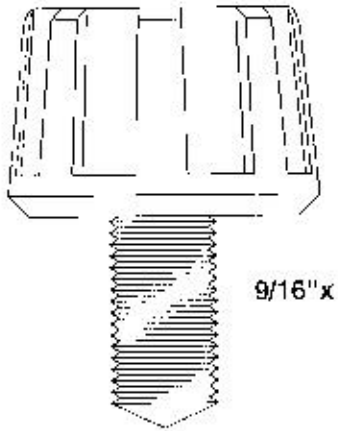
Figure #6

SCUBAPRO® Mark 5 First Stage

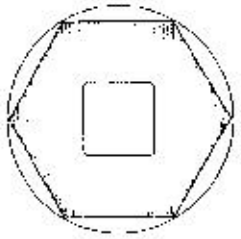
Applying Torque To The 1" Yoke Nut





1" Yoke Nut Socket

1" Socket,
Bottom View



Notes:

The Scubapro torque specification for the 1" yoke nut is 325-375 inch pounds. This figure converts to 27-31 foot pounds. Access to the socket is gained through the yoke screw hole by using a 3" x 3/8" drive extension. If you do not have this extension in your tool assortment, it is advised that you take a yoke along with you when you purchase the extension. Most of the extensions that I tried fit easily through the 1/2" hole in the yoke, but some may be too large. If your torque wrench is 1/2" drive, a 3/8" to 1/2" adapter will also be necessary to make the connection to the extension (not shown). The socket is designed to handle this torque range without damage except for small stress cracks that may develop along a line adjacent to the corners of the hex broach. These cracks are not considered to be a defect and do not hamper the performance of the socket in any way (see detail right).

The wall thickness at the corners of the hex has been reduced to .010"-.012". Small stress cracks may develop on the exterior of the socket at these points. These cracks are not considered to be a defect and do not hamper the performance of the socket in any way.

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Figure #7 *SCUBAPRO® Mark 5 First Stage*

Full Cutaway

Notes:

The illustration below shows all major components of the Scubapro Mk 5 first stage assembled in cutaway view. The yoke screw is not shown to conserve space. All dynamic o'rings are noted and should be replaced. The remainder of the o'rings are static and do not require replacement unless damaged.

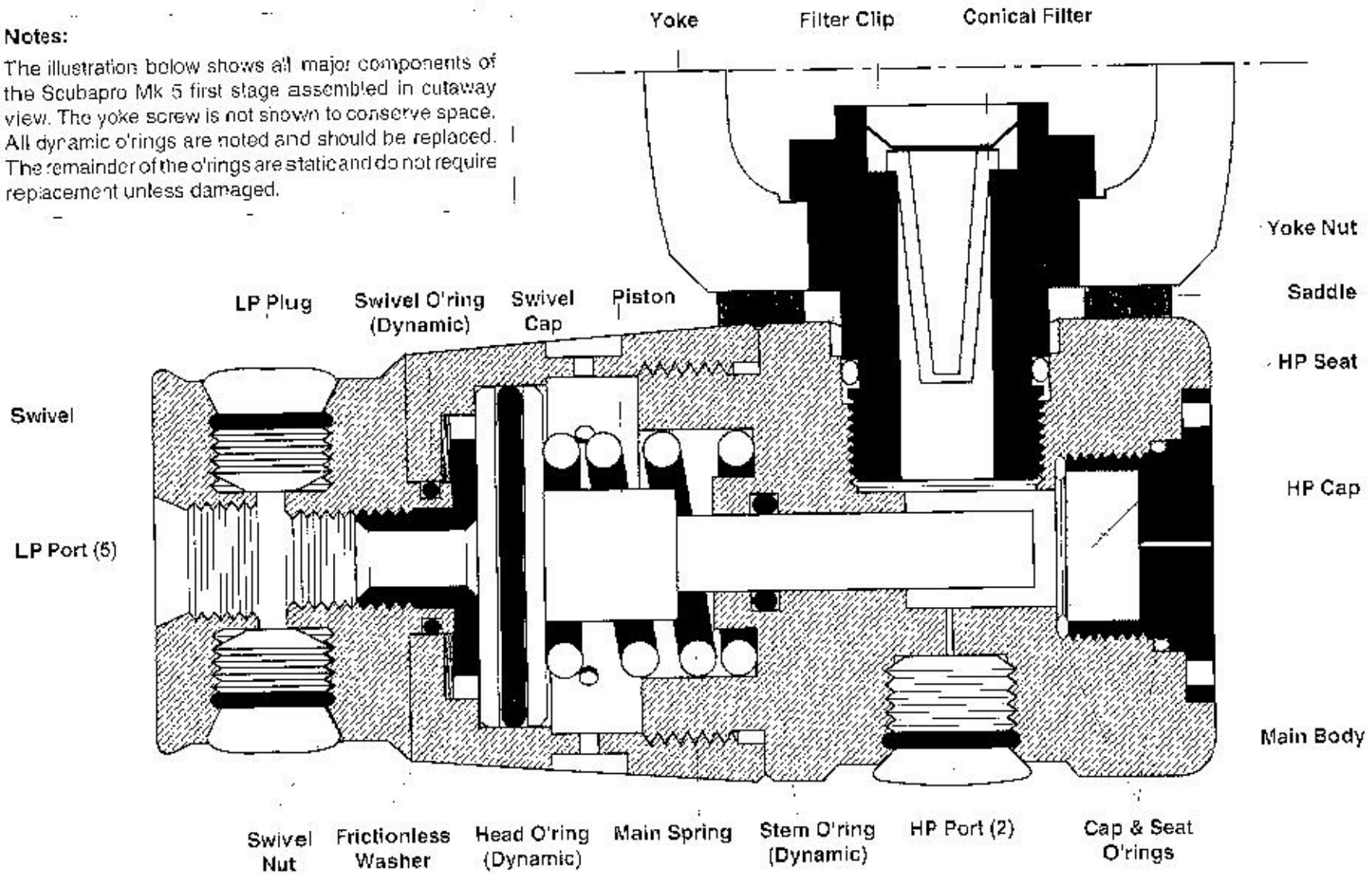

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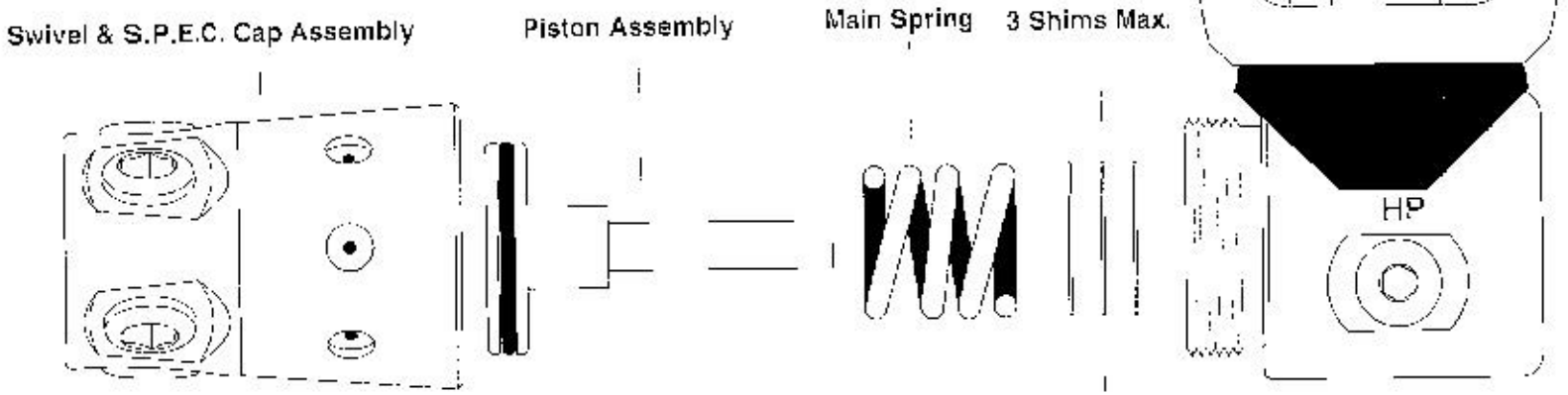
Figure #8

SCUBAPRO® Mark 5 First Stage

Main Spring Shims & S.P.E.C.

Notes:

If the intermediate pressure is too low, up to three spring shims can be placed between the spring and the main body. Each shim will increase the IP approximately 5 psi. If the IP is not brought into range after adding up to three shims, the spring is soft and should be replaced. If the IP is too high, consult the trouble shooting guide on the next page. Be sure to use a piston bullet when installing the piston in the main body. This will require that the HP cap be removed so that the bullet can be pulled out of the piston after it is in place (not shown).



Shim Rotated 90⁰ For Clarity

S.P.E.C. (Silicone Protected Environmental Cap)

S.P.E.C. kits are available as an accessory for all Scubapro first stages. The kit includes a special boot and a 7 gram tube of high viscosity silicone grease. S.P.E.C. should be added to any regulator that will be exposed to very cold water or water that is laden with high concentrations of sand or silt. The special grease is packed in the ambient chamber and retards ice build up and/or the exchange of contaminated water. The boot provides further protection and helps to retain the grease. The S.P.E.C. kit is supplied with complete instruction for installation. **Important Note: The boot should never be used unless the ambient chamber is packed with silicone.** (Boot not available for the Mark 5 first stage.)

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Figure #9

SCUBAPRO® Mark 5 First Stage

General Procedures & Trouble Shooting

General Procedures, All First Stages

- Precheck intermediate pressure before disassembly
- Precheck for any external air leaks before disassembly
- Disassemble using proper tools
- Inspect all parts for defects
- Degrease where necessary
- Clean all parts
- Replace all dynamic O'rings
- Replace the HP seat
- Replace the HP filter and filter retainer
- Reassemble all components
- Check intermediate pressure with new parts installed
- See Trouble Shooting Guide to analyze results

Mk 5 Schematic's Inside of

Intermediate Pressure Limits

Intermediate pressure limits must be between 125-145 psig at both supply pressures of 3000 and 300 psig. 0 psig intermediate pressure creepage allowed after seating of a new seat **Never exceed 160 psig IP.**

First stage mechanical principles are covered in Chapters 1-3 in the front of this manual. If you need additional information concerning this data, please refer to these three chapters or call Scubapro Technical Service Department or your regional representitive.

Symptom	Probable Cause	Solution
• Audible air leaks at porting	Loose plugs or hoses Damaged static o'rings O'ring not properly seated	Tighten where necessary Relube & replace o'rings Adjust o'ring alignment
• Air leaks through ambient ports	Defective piston stem o'ring Defective piston head o'ring	Relube & replace o'ring Relube & replace o'ring
• Low IP @ 3000 psi	Weak main spring	Replace or shim main spring
• High IP @ 3000 psi	Poor seating result Stiff main spring HP stem o'ring pinch	Replace HP seat Replace piston or main housing Replace spring or remove shims Check IP @ 300 psi
• Low IP @ 300 psi	Weak spring	Replace or shim spring
• High IP @ 300 psi	Stiff spring	Replace spring or remove shims
• Initial IP creep on gauge	New seat taking a set	Cycle regulator 20-25 times
• Continuous IP creep on gauge	Poor seating result	Replace HP seat Replace piston or body
• High IP @ 3000, Norm. IP @ 300 (balanced piston only)	HP stem o'ring pinch	Replace & relube stem o'ring Replace piston Replace body

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